

REMARKS

Claims 1-20 are now pending in the application. Claims 1-3, 9-12 and 18 are rejected. Claims 4-8 and 13-17 are objected to. Claims 19-20 are new. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

CLAIM OBJECTIONS

Claims 1-9 and 11-18 are objected to because of certain informalities. The objections are respectfully traversed.

Claim 1 is amended to overcome the Examiner's objection.

Claim 2 has been amended to overcome the Examiner's objections. References to "...said signals representative, in said rotor field reference frame..." (lines 6-8, 10-12) are amended to recite "...said rotor-field-reference-frame signals..."

Claim 4 is amended to overcome the Examiner's objections, with the following exception. Claim 4 recites that "...said harmonic decoupling block further comprises a subtractor block that subtracts at least the sixth harmonic cancellation signal..." (lines 16-17). There is no recitation in Claims 1-3 (upon which claim 4 depends) of a subtractor block of a harmonic decoupling block. Accordingly, Applicants submit that the recitation of a subtractor block in claim 4 is not confusing or ambiguous when considered together with the recitations of claims 1-3. Additionally, the recitation of "...said signals representative...motor phase current signal..." (lines 18-19) is amended as discussed above with reference to claim 2.

Claim 5 is amended as discussed with reference to claim 4 (lines 18-19).

Claim 8 is amended to overcome the Examiner's objections.

Claims 11, 13, 14 and 17 have been amended to overcome the Examiner's objections. Reference to "corresponding" has been deleted from claim 11 (dependent on independent claim 10) for consistency with claim 10.

REJECTION UNDER 35 U.S.C. § 102

Claims 1-3, 9-12 and 18 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Khambadkone et al. ("Compensated Synchronous PI Current Controller

in Overmodulation Range and Six-Step Operation of Space-Vector-Modulation-Based Vector-Controlled Drives"). This rejection is respectfully traversed.

Claim 1 is amended to recite "...a feedback path including a harmonic decoupling block that extracts each of a plurality of selected harmonic components from signals representative of a corresponding motor phase current signal and subtracts each extracted component from the representative signals to generate corrected feedback signals...".

In the system of Khambadkone et al., a first-order approximation of total harmonic voltage is used to estimate harmonic current (Fig. 7; p. 578). The harmonic current error due to the overmodulation is compensated by an estimated value (page 578; equations (18) and (19)). Compensating for selected harmonic components is not shown or suggested.

In contrast, in the drive system recited in claim 1, each of a plurality of selected harmonic components is extracted from signals representative of a corresponding motor phase current signal. Each extracted component is subtracted from the representative signals to generate corrected feedback signals. For example, a sixth harmonic component may be cancelled out, and a twelfth harmonic can be cancelled out in a similar manner (Figure 7; paragraphs 36-38). Applicants respectfully submit that claim 1 as amended should be allowed. Claims 2-9 depend from claim 1. Applicants submit that when the recitations of claims 2-9 are considered together with the recitations of amended claim 1, claims 2-9 also should be allowed.

Referring to independent claim 10, the claim is amended to recite "...extracting each of a plurality of selected harmonic components from signals representative of a motor phase current signal in a feedback path and subtracting each extracted component from the representative signals to thereby generate corrected feedback signals..." As previously discussed with reference to claim 1 and in contrast to the method recited in claim 10, extracting selected harmonic components is not shown or suggested in the system of Khambadkone et al. Applicants respectfully submit that claim 10 as amended should be allowed. Claims 11-18 depend from claim 10. Applicants submit that when the recitations of claims 11-18 are considered together with the recitations of amended claim 10, claims 11-18 also should be allowed.

REJECTION UNDER 35 U.S.C. § 103

Claims 1-3, 9-12 and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hiti et al. (U.S. Pat. No. 6,163,128) in view of Ho (U.S. Pat. No. 6,777,907). This rejection is respectfully traversed.

In the Office Action, operation above a base speed is interpreted to be overmodulated. Overmodulation, however, is defined in the specification as the operating region between $m = 0.908$ and $m = 1$ where m is a modulation index or figure of merit (paragraphs 1-3). Applicants respectfully submit that the definition stated in the Office Action is incorrect and inconsistent with the specification. Further, neither Hiti et al. nor Ho, alone or in combination, describe or suggest "...signals to drive the three-phase voltage source inverter in an overmodulated six-step mode" as recited in independent claims 1 and 10. Accordingly, claims 1 and 10 should be allowed. Claims 2-9 depend from claim 1, and claims 11-18 depend from claim 10. Applicants submit that when the recitations of claims 2-9 and 11-18 are respectively considered with the recitations of claims 1 and 10, claims 2-9 and 11-18 also should be allowed.

ALLOWABLE SUBJECT MATTER

The Examiner states that claims 4-8 and 13-17 would be allowable if rewritten in independent form. Accordingly, Applicants have added new independent claims 19 and 20. Claim 19 includes the recitations of claims 1-4. Claim 20 includes the recitations of claims 11-13. Therefore, claims 19 and 20 should now be in condition for allowance.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested.

If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (313) 665-4969.

If for some reason a fee needs to be paid as well as one-month extension fee, please charge Deposit Account No. 07-0960 for the fees, which may be due.

Respectfully submitted,

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